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PATENT SPECIFICATION

Inventor: DAVID HERBERT YOUNG

775,911

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COMPLETE SPECIFICATION

Improvements in Breathing Apparatus for use in Aircraft

We, THE WALTER KIDDE COMPANY LIMITED, a British Company of Belvue Road, Northolt, Greenford, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to breathing apparatus intended for use in aircraft.

It is a regulation that the pilot of a pressurised aircraft shall use a breathing mask at all times during flight to guard against loss of control of the aircraft through the physiological effects due to loss of cabin pressure. The continuous wearing of such a mask is uncomfortable and hampering. It is an object of the present invention to construct a breathing mask which is normally held clear of the face, but which is automatically brought over the face of the wearer when the cabin pressure is reduced below a predetermined value.

It will be appreciated that any emergency breathing apparatus of this kind must come into operation very rapidly to be of real value, because loss of cabin pressure would be very rapid. The operation of the device is therefore preferably controlled by means of an aneroid-operated valve, which releases gas, i.e. oxygen, from a bottle to provide the power necessary to force the mask over the wearer's face.

According to the present invention a breathing apparatus comprises a harness or headpiece, and a collapsible breathing mask supported by the harness or headpiece, the mask ordinarily being supported clear of the face of the wearer in a collapsed condition, the supply of oxygen under pressure to the mask being effective to bring the mask in an erected condition into position against the face of the wearer, to permit oxygen to be supplied to the wearer.

One form of construction made in accordance with the invention is described in accordance with the accompanying drawings wherein

[*Price 3s. 6d.*]

Figure 1 is a diagrammatic representation of a breathing mask fitted to a wearer

Figure 2 is a section through the mask

Figure 3 is a section on line A—A of Figure 2.

In the present construction the mask *a* is supported on a rigid tubular metal boom *b* secured to a head harness *c*, which can also incorporate earphones for use on an aircraft inter-communication system.

Oxygen is supplied to the mask *a* through the tubular boom *b* and is led up through a flexible tube b^1 from an oxygen cylinder. When the internal pressure in the aircraft falls below a predetermined value, an aneroid-operated valve of known construction opens to permit oxygen to flow from the cylinder through the tube b^1 and the boom *b* to the mask *a*.

The construction of the mask *a* is shown in Figure 2. The mask itself comprises a rubber bladder *d*, which, when inflated, is adapted to expand so as to press against the face of the wearer. Owing to its nature it will conform to the features of the face and thus provide a seal between the face of the wearer and the mask and thus provide an enclosed space around the wearer's mouth. The bladder is of generally annular shape, being oval in the present example. For ease of construction the bladder *d* is provided with open skirts *e*, which are held between two rigid members *f*, which are themselves clamped together between the two parts of a banjo assembly *g*, which are tightened together by means of a domed nut *k*. The nut *k* and sealing washers *j* ensure that gas entering the mask through passage *h* in the banjo assembly cannot leak out.

The bladder *d* is normally held in the collapsed position shown in full lines in Figure 2, but is adapted to be inflated to assume the shape shown in dotted lines when oxygen enters the tubular boom *b* from the cylinder and is held against the face by inflation due to the pressure in the boom *b*. In order that this shall be effected and in order that the bladder

shall be inflated almost instantly when the gas starts to flow, a simple pressure maintaining valve, comprising a spring-loaded ball *o*, is mounted in the banjo assembly. The valve does not open until the pressure in the boom *b* has built up sufficiently and by that time the bladder *d* is fully inflated through the connection tube *n*, which leads out f the boom *b* upstream of the valve *o* and is connected to the tube *m* which is integral with the bladder *d*.

In the construction shown in the drawing the mask is constructed so as to supply oxygen to the mouth only, the construction of the bladder being such as to obstruct the nostrils. The form of the mask can, however, be varied considerably. It can, by correct shaping of the bladder, be made as an oral/nasal mask. It can also be made so as to lie to one side of the mouth in the deflated condition.

A microphone *p* can be incorporated, as shown, within the mask and the leads *q* can be taken through the walls of the members *f*, the compressed rubber skirts *e* of the bladder providing a seal to prevent leakage of gas.

What we claim is:—

1. A breathing apparatus comprising a harness or headpiece, a collapsible breathing mask supported by the harness or headpiece, the mask ordinarily being supported clear of the face of the wearer in a collapsed condition, the supply of oxygen under pressure to the mask being effective to bring the mask in an erected condition into position against the face of the wearer.

2. A breathing apparatus according to Claim 1 in which the mask is supported on a rigid tubular boom, through which oxygen is lead to the mask.

3. A breathing apparatus according to Claim 1 or 2 wherein the mask is provided with an annular rubber bladder, carried in a normally uninflated state clear of the face of the wearer, but adapted on inflation to press against the face of the wearer so as to seal off the mouth and nose from surrounding atmosphere.

4. A breathing apparatus according to Claim 3 wherein the bladder comprises an annular strip of rubber, the edges of which are clamped together between two rigid members.

5. A breathing apparatus according to Claim 4 wherein the rigid members are clamped between the two parts of a banjo assembly through which oxygen is led into the sealed-off space within the mask.

6. A breathing apparatus according to Claim 3, wherein a pressure-maintaining valve is inserted in the oxygen line leading to the mask and a lead is taken to the bladder upstream of the valve, so that the bladder is inflated before oxygen is admitted to the mask.

7. A breathing apparatus constructed and adapted to operate substantially as herein described with reference to the accompanying drawings.

STEVENS, LANGNER, PARRY & ROLLINSON,
Chartered Patent Agents &
Agents for the Applicants.

PROVISIONAL SPECIFICATION

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It will be appreciated that any emergency breathing apparatus of this kind must come into operation very rapidly to be of real value, because loss of cabin pressure would be very rapid. The operation of the device is therefore preferably controlled by means of an aneroid-operated valve, which releases gas from a bottle to provide the power necessary to force the mask over the wearer's face.

According to the present invention a breathing mask comprises a harness or headpiece supporting a collapsible mask, the mask ordinarily being supported clear of the face of the wearer in a collapsed condition and being adapted to be brought into position over the wearer's face in response to reduction of the ambient air pressure to a predetermined minimum value to permit oxygen to be supplied to the wearer.

One form of the invention comprises a rigid headpiece bearing on the crown of the head and holding the collapsible mask near, but away from, the mouth and nose The mask itself is hollow and is constructed so that on inflation one wall is pressed against the face

by the internal pressure to seal around the mouth and nose.

The inflation of the mask is preferably effected by release of oxygen from the oxygen bottles, which supply oxygen for breathing purposes. The inflating gas is however, supplied at somewhat higher pressure than the breathing gas to ensure a perfect seal against the face.

STEVENS, LANGNER, PARRY & ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.

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775,911 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

FIG. 1.

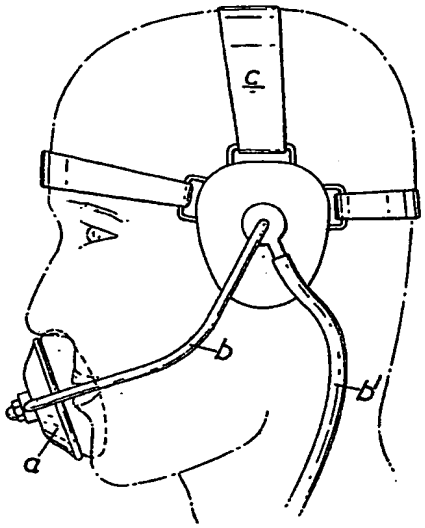

FIG. 2.

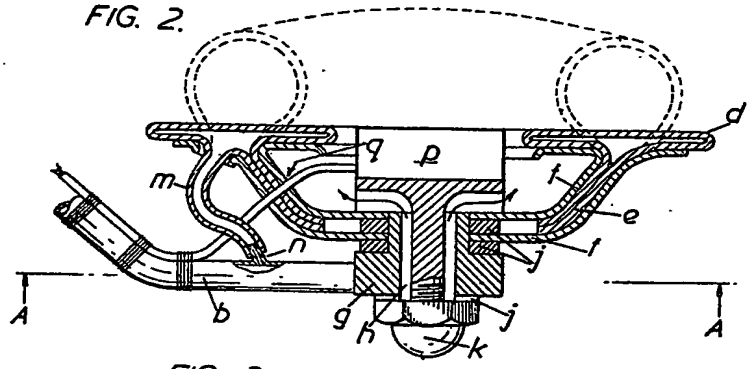

FIG. 3.